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Serial No.: 09/865,612

Confirmation No.: 4697

Filed: May 25, 2001

For: METHODS, COMPLEXES, AND SYSTEMS FOR FORMING METAL-CONTAINING FILMS ON SEMICONDUCTOR STRUCTURES

Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the above-identified application:

18. (Original) A chemical vapor deposition system comprising:

a deposition chamber having a substrate positioned therein;

a vessel containing a precursor comprising one or more complexes of the

formula:



wherein:

M is a group IVB, VB, or VIB metal;

each R^1 , R^2 , R^3 , and R^4 is independently H or an organic group;

L is selected from the group of CO, NO, CN, CS, CNR^5 , R^6CN , or R^7 ,

wherein each R^5 , R^6 , and R^7 group is independently an organic group;

$x = 1$ to 4; and

$y = 1$ to 4; and

a source of inert carrier gas for transferring the precursor to the chemical vapor deposition chamber.

19. (Original) A chemical vapor deposition system comprising:

a deposition chamber having a substrate positioned therein;

a vessel containing a precursor composition comprising one or more complexes

of the formula:



wherein:

M is a Group IVB, VB, or VIB metal;

each R^1 , R^2 , R^3 , and R^4 is independently H or an organic group;

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each L is independently CO, NO, CN, CS, CNR⁵, R⁶CN, or R⁷, wherein each R⁵, R⁶, and R⁷ group is independently an organic group; x = 1 to 4; and y = 1 to 4.

20. (Currently Amended) The system of claim 38 [[19]] wherein the deposition chamber is adapted for forming a metal-containing film comprising vaporizing the precursor composition and directing it toward the semiconductor substrate or substrate assembly using a chemical vapor depositional technique.
21. (Original) The system of claim 20 wherein the chemical vapor deposition technique comprises flash vaporization, bubbling, microdroplet formation, or combinations thereof.
22. (Original) The system of claim 20 wherein the precursor composition is vaporized in the presence of a carrier gas.
23. (Original) The system of claim 20 wherein the precursor composition is vaporized in the presence of a reaction gas.
24. (Original) The system of claim 23 wherein the reaction gas is selected from the group of H₂, SiH₄, Si₂H₆, NH₃, N₂H₄, PH₃, AsH₃, GeH₄, t-BuSbMe₂, H₂S, H₂Se, Te(allyl)₂, and combinations thereof.
25. (Original) The system of claim 19 wherein each R¹, R², R³, and R⁴ group is independently H or a (C₁-C₃₀)organic group.
26. (Original) The system of claim 19 wherein the complex is a monomer.

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27. (Original) The system of claim 19 wherein each R^1 , R^2 , R^3 , and R^4 group is independently H or a (C_1-C_4) alkyl moiety.
28. (Original) The system of claim 19 wherein R^7 is cyclopentadienyl or a substituted cyclopentadienyl.
29. (Original) The system of claim 19 wherein the precursor composition is a liquid.
30. (Original) The system of claim 19 wherein the metal is a Group VB metal.
31. (Original) The system of claim 30 wherein the metal is vanadium.
32. (Currently Amended) The system of claim 20 ~~[[19]]~~ wherein the metal-containing film is a Group IVB, VB, or VIB metal alloy film.
33. (Original) A chemical vapor deposition system comprising:
a deposition chamber having a semiconductor substrate or substrate assembly positioned therein;
a vessel containing a precursor composition comprising one or more complexes of the formula:
$$[(R^1)NC(R^2)C(R^3)N(R^4)]_xML_x$$

wherein:
M is a Group IVB, VB, or VIB metal;
each R^1 , R^2 , R^3 , and R^4 is independently H or an organic group;
each L is independently CO, NO, CN, CS, CNR^5 , R^6CN , or R^7 , wherein each R^5 , R^6 , and R^7 group is independently an organic group;
 $x = 1$ to 4; and

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y = 1 to 4.

34. (Original) The system of claim 33 wherein each R^1 , R^2 , R^3 , and R^4 is independently H or a (C_1-C_{30}) organic group.
35. (Original) The system of claim 33 wherein the complex is a monomer.
36. (Original) The system of claim 33 wherein each R^1 , R^2 , R^3 , and R^4 group is independently H or a (C_1-C_4) alkyl moiety.
37. (Original) The system of claim 33 wherein R^7 is cyclopentadienyl or a substituted cyclopentadienyl.
38. (Currently Amended) A chemical vapor deposition system comprising:
a deposition chamber having a semiconductor substrate or substrate assembly positioned ~~positioned~~ therein;
a vessel containing a precursor composition comprising one or more liquid complexes of the formula:
$$[(R^1)NC(R^2)C(R^3)N(R^4)]_xML_y$$

wherein:
M is a Group IVB, VB, or VIB metal;
each R^1 , R^2 , R^3 , and R^4 independently H or a $(C_1 - C_{30})$ organic group;
each L is independently CO, NO, CN, CS, CNR^5 , R^6CN , or R^7 , wherein each R^5 , R^6 , and R^7 group is independently an organic group;
x = 1 to 4; and
y = 1 to 4.